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INTRODUCTION

Currently native fish communities in the southwest are rapidly declining. Most of these reductions appear to be due to loss of critical habitat, declining water quality, and invasion of non-native species associated with the damming of the Colorado River system (Hubbs and Deacon 1964, Minckley and Deacon 1968, Minckley 1973, Deacon 1979). The fish communities of the North and East Forks of the Virgin River within and surrounding Zion National Park are comprised primarily of native species and may represent the few unrestricted, relatively unimpacted streams remaining in the southwest.

This study addresses the food preferences of the four species of native fish (speckled dace *Rhinichthys osculus*; flannelmouth sucker *Catostomus latipinnis*; desert sucker *Catostomus clarki*; Virgin spinedace *Lepidomeda mollispinis mollispinis*) found in the North and East Forks of the Virgin River inside the boundaries of Zion National Park. Fish food habits were evaluated at various times of the year and linked to seasonal distribution of available food resources.

METHODS

Study Area

The North and East Forks of the Virgin River are located in the Wasatch and Uintah Mountain and Colorado Plateau Ecoregions of southwestern Utah (Omernik 1987). Like most unregulated arid streams, the East and North Forks are subject to frequent and intense flash floods. Summer high flow events can be dramatic, with discharges increasing by a order of magnitude (Diaz 1992). The intensity and magnitude of these sudden flows are highly erosive and have the potential to alter the physical characteristics of the stream channel and bed materials.

Two reaches were chosen on the North and East Forks of the Virgin River within the boundaries of Zion National Park. The East Fork site was located approximately 3 km upstream

from the lower park boundary (37°12'N 113°1'W). The North Fork site was located approximately 1 km upstream from Angles Landing (37°17'N 113°3'W). The North Fork site appeared to receive less solar insolation and has a greater diversity of habitat than the East Fork site. Deacon *et al.* (1991) found that the North Fork reach had deeper pools and riffles, with abundant periphyton growth, than the East Fork reach. The substrate at the North Fork site was predominantly large cobble and small boulders that was highly susceptible to being embedded by sand transported and deposited by high flows. The substrate at the East Fork site was comprised primarily of cobble and small boulders; in addition large areas of sand and gravel were also found.

Field and Laboratory Methods

To estimate the food preference of the four native fish species 3 to 10 individuals of each species were collected in June, August and October of 1988, and in April and May of 1989. Fish were preserved in the field to insure the integrity of foregut and stomach contents. Stomach contents were divided into various taxonomic categories: 1) aquatic invertebrates, 2) terrestrial invertebrates, 3) algae, 4) plant material, 5) organic material (detritus, diatoms, and other unidentifiable debris), and 6) inorganic material (primarily sand). Invertebrates were identified to the lowest taxonomic level possible. The percent volume of the six categories was determined by placing the stomach contents in a petri dish and visually estimating the relative percent. The percent volume of each food category was considered individually for each site by collection month. Individual fish stomach contents were pooled by species due to small sample size.

In addition, an electivity index was applied to the aquatic invertebrate data in order to assess possible feeding preferences. Numerous electivity or feeding preference indices have been developed which quantify electivity or preference by comparing the proportion of the i^{th} food item in the diet with the proportion of that same food item in the environment (Ivlev 1961,

Jacobs 1974, Manly 1974, Chesson 1978, 1981, 1983, Strauss 1979, Vanderploeg and Scavia 1979a, 1979b). Although all preference indices have inherent biases Lechowicz (1982) concluded that the relative electivity (E^*) of Vanderploeg and Scavia (1979a, 1979b) was the single best index of electivity or preference. This index, based on selectivity coefficients of Manly (1974) and the number of available food types, has the property that the maximum attainable preference is an increasing function of the number of food items.

In order to determine food selectivity for native species, stomach contents were pooled for each sample date and site, and compared to the available resource base using a relative electivity index (E^*; Vanderploeg and Scavia 1979a, 1979b) calculated as:

$$E^* = (W_i - (l/n)) / (W_i + (l/n)).$$

Where the selectivity coefficient (W_i) is defined as:

$$W_i = (r_i/p_i) / \text{Sum } (r_i/p_i),$$

with:

n = the total number of food items
r_i = the proportion of the i^{th} food item in the stomach of the species of interest
p_i = the proportion of the i^{th} food item in the environment.

Relative electivity index values vary from -1 to 1. An index value of zero indicates feeding is directly proportional to the abundance of the food item in the environment or random feeding. If the index value is positive the food item is preferred, if negative the food item is not preferred.

This does require a reasonably accurate assessment of the available environmental food resource base. To characterize the available food resource (i.e. the quantity of benthic invertebrate taxa) in the environment, qualitative samples collected at time of fish sampling were

correlated to quantitative seasonal samples collected in 1987 to determine if they reflected the relative abundance of the actual benthic taxa present in the environment. In 1988, in conjunction with fish collections the food resource base was characterized by combining kick net (1mm mesh) samples of invertebrates taken from the predominant benthic habitats. Invertebrates collected were identified, enumerated, and correlated to quantitative benthic invertebrate collections made in 1987 (see Boyle *et al*. 1993) using Pearson product-moment correlation (SAS 1991). Frequency data from kick net samples were converted to percent volume by weighing the number of individual taxa by a volume coefficient derived from the measured volume of reference taxa collected during the 1987 collection season.

RESULTS AND DISCUSSION

Fish Community Structure

The fish community in the East and North Forks of the Virgin River is naturally depauperate, which is typical of southwestern arid streams (Deacon and Minckley 1974). In 1987, five species (speckled dace; flannelmouth sucker; desert sucker; Virgin spinedace; and brown trout *Salmo trutta*) were collected at the East Fork and North Fork sites (Boyle et al. 1992; Figure 1). The speckled dace, flannelmouth sucker, desert sucker, and Virgin spinedace are all native to the Virgin River basin; the latter an endemic subspecies.

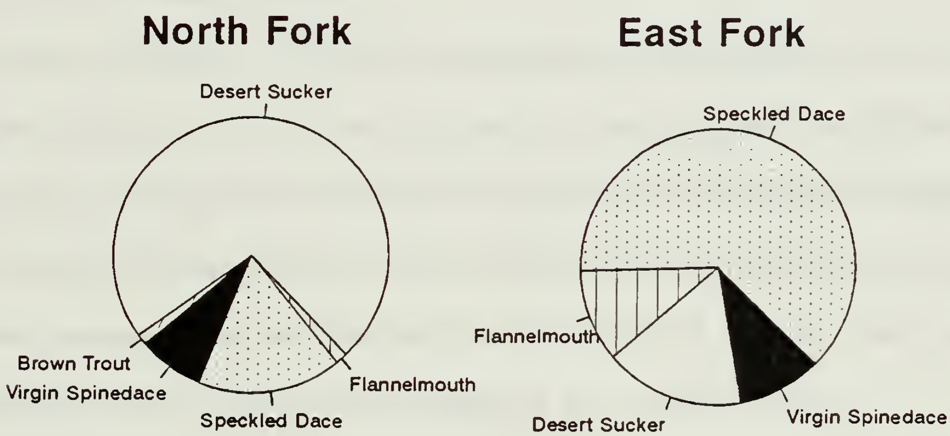

Figure 1. The species composition of fish communities found at the East Fork and North Fork sites of the Virgin River within Zion National Park.

In 1987, Virgin spinedace made up approximately 10 percent of the community at both the North and East Fork sites. The spinedace was generally observed in mid-water within deep runs and pools associated with cover (Hoefs, pers obs.) Speckled dace comprised 63 percent of the individuals collected and dominated the fish community at the East Fork site. The speckled dace appeared to be more widely dispersed throughout the reach than the spinedace

(Hoefs, pers. obs.). Sigler and Miller (1963) reported that this species lives in a wide variety of habitats. At the North Fork site speckled dace comprised less than 20 percent of the individuals where the community was dominated by desert suckers. Desert suckers made up approximately 75 percent of the individuals collected at the North Fork site. Few flannelmouth suckers were found (less than 2 percent of the community). On the East Fork, however, the number of desert suckers was not greater than the number of flannelmouth suckers collected, approximately 11 and 16 percent of the community, respectively. Even though the fish communities at the East and North Fork sites were similar in species composition, relative species abundances varied.

The Benthic Food Resource Base

In general, patterns of benthic macroinvertebrate abundances in 1987 and 1988 were similar (see Appendix A). The relative abundance of taxa collected in August and October of 1988 were highly correlated to abundance of taxa found in 5 replicate surber samples collected during August and October of 1987. In July of 1988 numbers of Plecoptera and Coleoptera were higher than previously found in collections from the North Fork and, as a result, July 1987 and 1988 collections were not significantly correlated at α = .05 level (Table 1).

Table 1. Correlation coefficients between 1987 and 1988 invertebrate collections for the North and East Fork of the Virgin River. Pearson's correlation (*r*) and probability values (*P*).

	North Fork			East Fork		
	July	August	October	July	August	October
r	0.2090	0.8068	0.5993	0.8520	0.7854	0.6205
P	(0.3054)	(0.0001)	(0.0012)	(0.0001)	(0.0001)	(0.0007)

Density of the invertebrates found in August of 1987 and 1988 at the East Fork site were low. Relatively few taxa and low numbers of individuals were found. Indications of substrates

and benthic habitat disturbance due to high flows were observed in the field. Boyle *et al.* (1993) found that invertebrate densities were often substantially reduced by high flow events, common in mid- and late summer. The taxa and relative abundance of the invertebrates collected in 1988 from the lower East Fork and North Fork Rivers, in general, exhibited trends similar to those observed in 1987. In 1987 following high flow events in July and August invertebrate densities and number of taxa decreased. As a result the qualitative 1988 data was considered to reflect the available benthic food source in the environment at the time of the fish collections.

Typically, invertebrate densities found that in the spring and early summer at the East and North Fork sites were relatively high (Boyle *et. al* 1993). However, invertebrate densities and, as a result, available food resources are reduced as a result of localized disturbance associate with high flows during mid to late summer. Flow events with sufficient force to alter the substrate have been found to reduce total invertebrate densities in desert streams by 98 percent (Fisher et al. 1982). In September and October, however, density and diversity of invertebrates again increased. In addition, in 1987 the densities of invertebrates in the East Fork were consistently lower than the densities found at the North Fork site (Boyle *et al.* 1993).

Food Habits of Native Species

To determined food preferences of the native fish from the East and North Fork sites, 89 Virgin spinedace, 84 speckled dace, 80 desert suckers and 61 flannelmouth suckers were collected in July, August and October of 1988, and in April and June of 1989, and stomachs analyzed. No flannelmouth suckers were found at the North Fork site in July or October of 1988 (see Appendix B for numbers of individuals collected on each date).

<u>Virgin spinedace</u>

Invertebrates, both aquatic and terrestrial, comprised the majority of the diet of the 89 Virgin spinedace examined from the East and North Forks (Figure 2). The only exception was

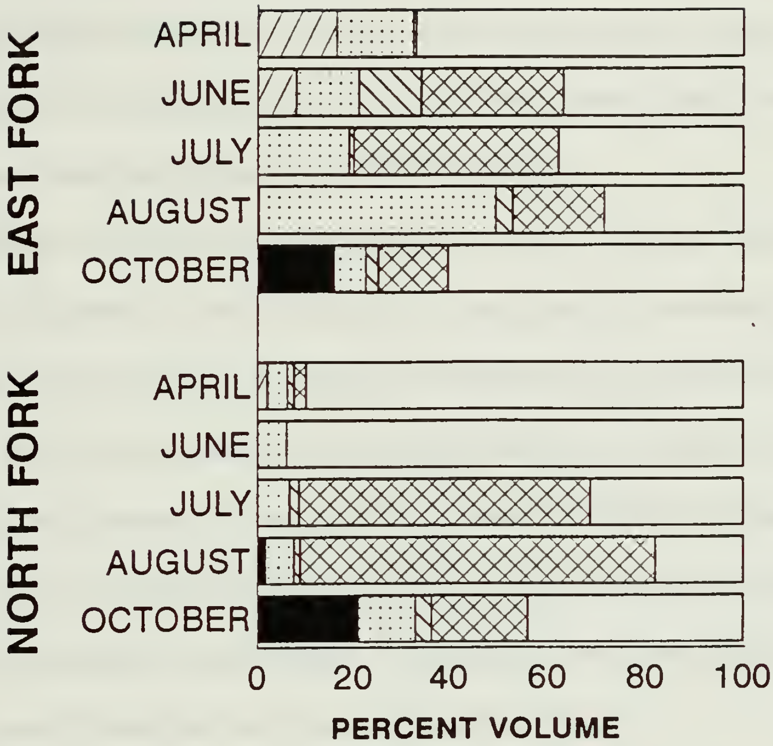

Figure 2. The composition of general food items (■ Algae; ▨ Plant material; ⊡ Organic material; ⧅ Inorganic material; ⊠ Terrestrial Invertebrates; and □ Aquatic Invertebrates) found in the stomachs of the Virgin spinedace collected from the East and North Forks of the Virgin River.

after a high flow event in August on the East Fork, when organic material comprised over 50 percent of diet. Aquatic invertebrates comprised the majority of the invertebrates consumed at the North Fork Site in April and June. Drifting terrestrial invertebrates, primarily Formicidae, replaced aquatic invertebrates as the most important food item in July and August. Aquatic insects were again the dominant food item in October, however, terrestrial invertebrates were still a substantial part of the Virgin spinedace diet. Only small amounts of organic, inorganic, algae, and plant material were found in the Virgin spinedace diet, except during October when algae and organic material comprised over 30 percent of the diet. On the East Fork, both aquatic and terrestrial invertebrates were consumed in similar proportions, except during April when aquatic

invertebrates dominated the Virgin spinedace diet. The proportion of organic and plant material in the diet of the Virgin spinedace at the East Fork site was markedly higher than at the North Fork site throughout the sampling period. Only in October was algae consumed by the Virgin spinedace in any substantial amount at the North Fork site,.

Of the aquatic invertebrates selected by the Virgin spinedace, ephemeropterans, and dipterans were consumed in large proportions throughout the sampling period (Table 2). Ephemeropterans, family Baetidae, comprised the majority of the aquatic invertebrates found in the stomachs of the Virgin spinedace. Even though baetids were present in high proportions in the diet of the Virgin spinedace at both sites throughout the sampling season, electivity values were negative, due to the relatively high proportion of baetids available in the environment for consumption. The ephemeropteran family, Tricorythidae, was preferred by Virgin spinedace, however, only when no emergent ephemeropterans were found.

The volume of emerging adult ephemeropterans found were high during some of the months sampled and comprised a significant proportion of the aquatic invertebrates consumed by the Virgin spinedace. Electivity values indicated a high preference for emerging ephemeropterans drifting in the water column or on the surface. However, these numbers are inflated since only benthic habitats, not mid- or surface-water habitats, were sampled to represent the available environmental food resource base.

Both dipteran families, Chironomidae and Simuliidae, were found in significant proportions on most dates in the Virgin spinedace diet, along with an occasional Athericidae (*Atherix* sp.). Because of *Atherix* sp. relatively larger of size, when present it comprises a substantial proportion of the stomach volume. Negative electivity values indicated that at the East Fork site, Virgin spinedace were not actively selecting dipterans. This was not the case, at the North Fork site, where chironomids were selected in most months with the exception of August when

Table 2. Relative proportions of the various aquatic invertebrates found in the environment (p_i) and in the diet (r_i) of the Virgin spinedace in the East and North Forks in July, August and October of 1988. Electivity index values (in parentheses) are presented below. Volumes with negative values indicate no preference for the item, positive values indicate a preferred item, and zero values indicate random feeding.

	East Fork						North Fork					
	July		August		October		July		August		October	
	p_i	r_i	p_i	r_i	p_i	r_i	p_i	r_i	p_i	r_i	p_i	r_i
Plecoptera												
Perlodidae							14.7	0	3.6	0	0.7	0
							(-1.00)		(-1.00)		(-1.00)	
Ephemeroptera												
Ephemerellidae							3.3	0			3.4	0
							(-1.00)				(-1.00)	
Baetidae	68.3	13.8	25.8	18.6	73	62.4	39.3	42.1	72.5	61.2	48.9	73.7
	(-0.44)		(-0.67)		(-0.70)		(-0.41)		(-0.76)		(-0.16)	
Leptophlebiidae							0.1	0				
							(-1.00)					
Heptageniidae							2	0	4.1	0	1.7	0
							(-1.00)		(-1.00)		(-1.00)	
Tricorythidae	1.8	3.3	4.1	6.2	1.9	0	0.6	5.2	4.9	0	2	0
	(-0.44)		(-0.41)		(-1.00)		(+0.54)		(-1.00)		(-1.00)	
Emergents	0	32.9	0	24.8	0	6			0	27.2	0	6
	(+0.75)		(+0.74)		(+0.10)				(+0.79)		(+0.49)	
Trichoptera												
Hydropsychidae												
Hydropsyche sp.	3.3	32.9			3.4	3	28.8	21	4.9	0	23.6	6
	(+0.35)				(-0.69)		(-0.56)		(-1.00)		(-0.78)	
Hydroptilidae												
Mayatrichia							2.3	0	0.5	0		
							(-1.00)		(-1.00)			
Ochotrichia sp.	0	3.3			0.1	5	0.3	0			0.1	0
	(-0.18)				(+0.82)		(-1.00)				(-1.00)	
Diptera												
Empididae					0.2	0						
					(-1.00)							
Chironomidae	1.2	3.9	4.1	0.1	4.3	14	0.9	15.8	3.8	11.6	0.5	9.2
	(-0.18)		(-0.98)		(-0.20)		(+0.74)		(+0.04)		(+0.80)	
Simuliidae												
Simulium sp.	3.6	6.6			8.9	6			2.5	0	1.8	5.1
	(-0.44)				(-0.76)				(-1.00)		(+0.15)	
Athericidae												
Atherix sp.	4.8	0	22.1	49.7	1.5	1	0.5	0	2.3	0		
	(-1.00)		(-0.24)		(-0.76)		(-1.00)		(-1.00)			
Muscidae					4	2						
					(-0.81)							
Ceratopogonidae	0.2	0			0	0.4						
	(-1.00)				(-0.84)							
Stratiomyidae							0	5.2				
							(+0.34)					
Lepidoptera												
Pyralidae												
Petrophila sp.			19.3	0			0.5	0			0.4	0
			(-1.00)				(-1.00)				(-1.00)	
Coleoptera	0	3.3					0	10.5				
	(-0.18)						(+0.61)					
Elmidae							5	0			0.2	0
							(-1.00)				(-1.00)	
Hemiptera												
Naucoridae							0.1	0				
							(-1.00)					
Megaloptera												
Corydalidae	15.2	0	24.8	0	1.1	0					16.1	0
	(-1.00)		(-1.00)		(-1.00)						(-1.00)	
Arachnida												
Hydracarina	1.5	0	0.7	0	1.3	0	1.5	0	0.8	0	0.5	0
	(-1.00)		(-1.00)		(-1.00)		(-1.00)		(-1.00)		(-1.00)	

ephemeropterans were emerging. Trichopterans (*Hydropsyche* sp. and *Ochotrichia* sp.) were also, in general, consumed by the Virgin spinedace, but in relatively smaller proportions to ephemeropterans and dipterans.

The majority of the diet of the Virgin spinedace was comprised of a wide variety of invertebrates in both the North and East Forks of the Virgin River. The high proportion of terrestrial invertebrates and emergent ephemeropterans in the Virgin spinedace diet indicated that they were feeding on drifting invertebrates in the water column or on the surface and are relying heavily on sight to capture food items. The diet of the Virgin spinedace has been reported to consist primarily of invertebrates, although occasional organic detritus and plant material has been found (Cross 1975, Greger and Deacon 1988). Rinne (1971) found a correlation between the types of food consumed by the Virgin spinedace and its availability. Even though he found the spinedace to be primarily an invertivore, plant and other materials as well were consumed according to their availability. At the East Fork site, substantial amounts of organic material were only found in the Virgin spinedace diet after high flows when reduced invertebrate densities were found.

<u>Speckled dace</u>

The diets of the 84 speckled dace examined from the North and East Forks were primarily comprised of aquatic invertebrates, with the exception those found in August at the East Fork site after substrates had been disturbed by high flows. In August the diet was remarkably similar to the diet of Virgin spinedace (Figure 3). Terrestrial invertebrates were consumed in moderate proportions only at the East Fork site in July and August. Cross (1975) found that aquatic insects comprised the majority of the speckled dace diet, but frequently terrestrial insects were consumed.

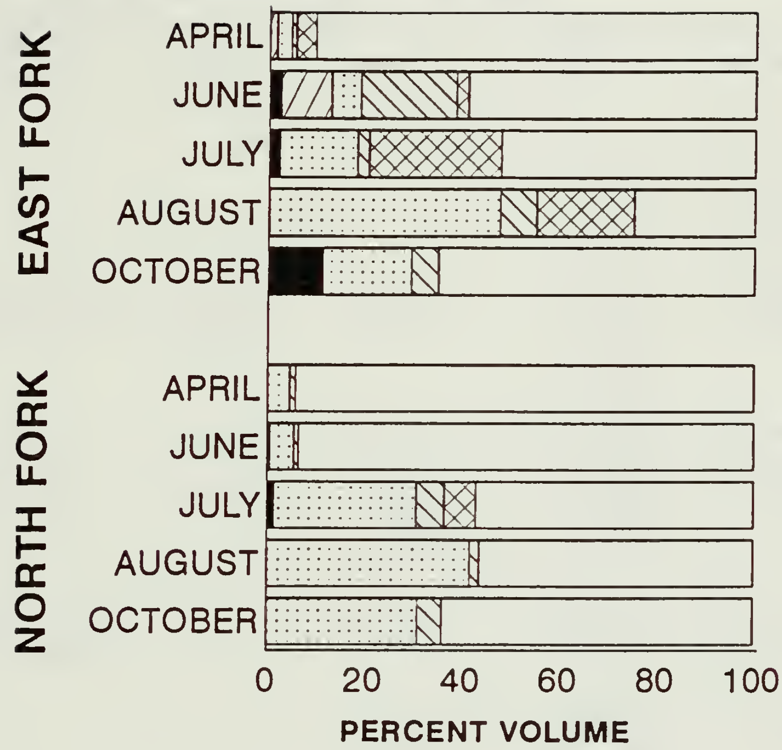

Figure 3. The composition of general food items (■ Algae; ▨ Plant material; ▦ Organic material; ▧ Inorganic material; ⊠ Terrestrial Invertebrates; and □ Aquatic Invertebrates) found in the stomachs of the speckled dace collected from the East and North Forks of the Virgin River.

The remainder of the speckled dace diet at the East Fork site was comprised of a variety of items. Algae, plants, organic and inorganic material were all present in substantial proportions at various times during the sampling season. At the North Fork site the speckled dace diet was less variable. In addition to the aquatic invertebrates and organic material, only a small proportion of inorganic material and algae were consumed.

The types of aquatic invertebrates consumed by speckled dace also varied between the two sites (Table 3). At the East Fork site, ephemeropterans and dipterans were predominant. Baetids were found in relatively high proportions in the environment and in the stomachs of the speckled dace, but were not being selected as indicated by negative electivity values. Various

Table 3. Relative volumes of the various aquatic invertebrates found in the environment (p_i) and in the diet (r_i) of the speckled dace in the East and North Forks of the Virgin River in July, August and October of 1988. Electivity index values (in parentheses) are presented below. Volumes with negative values indicate no preference for the item, positive values indicate a preferred item, and zero values indicate random feeding.

	East Fork						North Fork					
	July		August		October		July		August		October	
	p_i	r_i	p_i	r_i	p_i	r_i	p_i	r_i	p_i	r_i	p_i	r_i
Plecoptera												
Perlodidae							14.7	0	3.6	0	0.7	0
								(-1.00)		(-1.00)		(-1.00)
Ephemeroptera												
Ephemerellidae							3.3	0	0	4	3.4	0
								(-1.00)		(+0.67)		(-1.00)
Baetidae	68.3	38.6	25.8	29.6	73	40.4	39.3	60.6	72.5	83.5	48.9	83.7
		(-0.83)		(-0.38)		(-0.37)		(-0.24)		(+0.19)		(+0.24)
Leptophlebiidae							0.1	0				
								(-1.00)				
Heptageniidae							2	0	4.1	0	1.7	0
								(-1.00)		(-1.00)		(-1.00)
Tricorythidae	1.8	0	4.1	0	1.9	0	0.6	5.3	4.9	0	2	0
		(-1.00)		(-1.00)		(-1.00)		(+0.56)		(-1.00)		(-1.00)
Emergent					0	2.6	0	3.9				
						(+0.37)		(+0.21)				
Trichoptera												
Hydropsychidae												
Hydropsyche sp.	3.3	13.6			3.4	0	28.8	13.2	4.9	2	23.6	7.8
		(-0.18)				(-1.00)		(-0.69)		(-0.32)		(-0.52)
Hydroptilidae												
Mayatrichia							2.3	2.6	0.5	0		
								(-0.37)		(-1.00)		
Ochotrichia sp.					0.1	0	0.3	2.6			0.1	0
						(-1.00)		(+0.55)				(-1.00)
Diptera												
Empididae					0.2	0						
						(-1.00)						
Chironomidae	1.2	9	4.1	18.8	4.3	48.2	0.9	11.8	3.8	8.7	0.5	4.7
		(+0.11)		(+0.29)		(+0.81)		(+0.68)		(+0.49)		(+0.80)
Simuliidae												
Simulium sp.	3.6	13.6			8.9	8.6			2.5	2	1.8	3.9
		(-0.22)				(-0.10)				(+0.01)		(+0.35)
Athericidae												
Atherix sp.	4.8	18.2	22.1	0	1.5	0	0.5	0	2.3	0		
		(-0.22)		(-1.00)		(-1.00)		(-1.00)		(-1.00)		
Muscidae					4	0						
						(-1.00)						
Ceratopogonidae	0.2	6.8	0	0.5	0	0.2						
		(+0.70)		(-0.67)		(-0.71)						
Lepidoptera												
Pyralidae												
Petrophila sp.			19.3	37.6			0.5	0			0.4	0
				(-0.13)				(-1.00)				(-1.00)
Coleoptera												
Elmidae			0	10.8			5	0			0.2	0
				(+0.62)				(-1.00)				(-1.00)
Hemiptera												
Naucoridae							0.1	0				
								(-1.00)				
Megaloptera												
Corydalidae	15.2	0	24.8	0	1.1	0					16.1	0
		(-1.00)		(-1.00)		(-1.00)						(-1.00)
Arachnida												
Hydracarina	1.5	0	0.7	2.7	1.3	0	1.5	0	0.8	0	0.5	0
		(-1.00)		(+0.21)		(-1.00)		(-1.00)		(-1.00)		(-1.00)

dipterans (i.e., chironomids, simuliids, athericids, muscids, and ceratopogonids) were also consumed. Chironomids, however, were the only dipterans that appeared to be consistently preferred by the speckled dace. Greger and Deacon (1988) found that speckled dace fed primarily on aquatic invertebrates, primarily simuliid and chironomid larvae. Lepidoptera (*Petrophila* sp.) were also relatively important, comprising a substantial proportion of the stomach content volume when present, but they appeared to be incidentally consumed with an electivity value near zero.

At the North Fork site, ephemeropterans and dipterans were dominant in the stomachs of the speckled dace examined, but substantial proportions of trichopterans were also consumed. Baetids were again the predominant ephemeropterans present, but, unlike the East Fork site, where negative electivity values were found, baetids were a preferred food item in the speckled dace diet in August and October. Trichopterans (*Hydropsyche sp.*, *Mayatrichia sp.* and *Ochotrichia sp.*), although consumed in moderate proportions, with the exception of *Ochotrichia sp.*, were not preferred by the speckled dace. *Hydropsyche sp.*, at times were found in high proportions in the environment, but rarely consumed. These and other larger prey items, such as megalopterans, may not be available to small fish.

In contrast to the Virgin spinedace, the substantial proportion of organic material consumed in conjunction with primarily benthic invertebrates indicates that the speckled dace is generally feeding along or near the bottom. The speckled dace is generally considered to be omnivorous (i.e., feeding on a variety of aquatic invertebrates, algae, and organic detritus) and to forage primarily over the bottom, but occasionally rising to the surface to feed (Minckley 1973). Even though the diets of the speckled dace and Virgin spinedace overlap, their spatial segregation and resource partitioning would limit direct competition. Only when invertebrate densities were extremely low were their diets comparable.

Desert Sucker

The diets of the 80 desert suckers examined were remarkably consistent between the North and East Fork sites (Figure 4). Throughout the sampling period inorganic material and aquatic insects were present in the diets of the desert sucker, although, organic material (primarily unidentified diatoms and detrital material) dominated the diet. In addition, in April and June, substantial amounts of algae and plant material were also found in the diet.

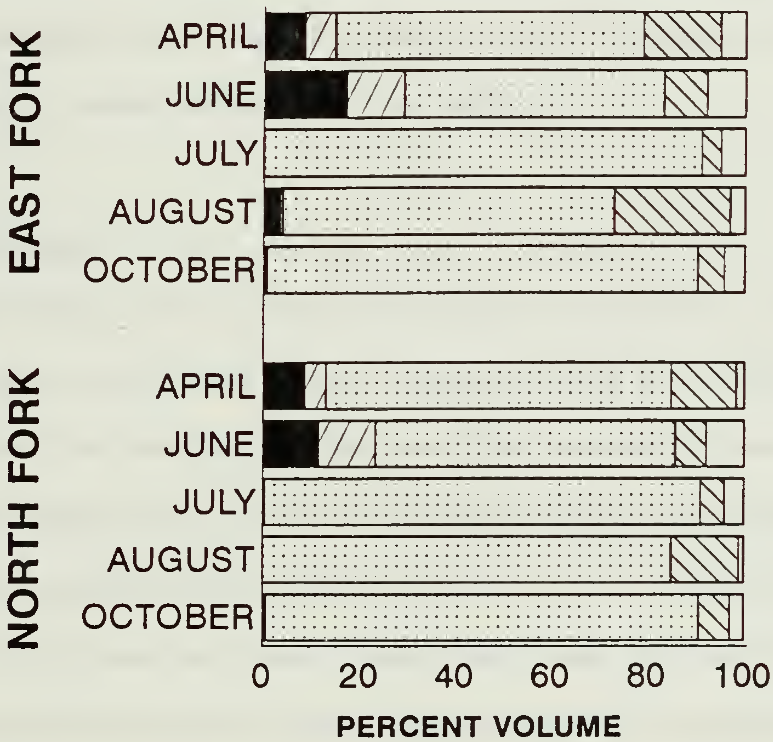

Figure 4. The composition of general food items (■ Algae; ▨ Plant material; ⊡ Organic material; ⧅ Inorganic material; ⊠ Terrestrial Invertebrates; and □ Aquatic Invertebrates) found in the stomachs of the desert suckers collected from the East and North Forks of the Virgin River.

Few aquatic invertebrates were found in the diet of the desert sucker (Table 4). Of those present, ephemeropterans, primarily baetids, and a variety of dipterans, including chironomids, simuliids, and athericids were the most prevalent. Electivity values indicated that chironomids were actively selected. However, values for chironomids may have been artificially inflated, due to incidental ingestion with periphyton. Chironomids were generally found in high densities in

the periphyton layer coating the large rocks at both sites.

The desert sucker has been reported to feed primarily on organic material, detritus, and periphyton coating rocks (Greger and Deacon 1988). Cross (1975) consistently found organic material in all the desert sucker stomachs he analyzed and in addition some contained filamentous algae and sand. At both sites the diet of the desert sucker was relatively consistent. The large quantities of organic material along with incidental ingestion of small proportions of associated invertebrates and inorganic material indicated that desert suckers were feeding primarily on bottom material scraped from rock surfaces.

Flannelmouth Sucker

The food habits of the 61 flannelmouth suckers examined were more generalized and variable than those of the desert suckers examined (Figure 5). The flannelmouth suckers collected from the North and East Fork sites were highly omnivorous, consuming a wide range of foods items including algae, plant material, organic material, aquatic insects and inorganic debris. Aquatic invertebrates and organic material were found, at times, in high proportions.

Cross (1975) found that aquatic insects were usually the most abundant food items ingested by flannelmouth suckers, however, sand, organic detritus, algae and amphipods were also consumed in large quantities at times. Greger and Deacon (1988) found that flannelmouth suckers feed more extensively on filamentous algae and invertebrates than do the desert suckers. Flannelmouth suckers consumed more invertebrates than the desert suckers examined at both sites with the exception of August. Algae was only found in low proportions in the diet of the flannelmouth suckers at the East Fork site.

Table 4. Relative volumes of the various aquatic invertebrates found in the environment (p_i) and in the diet (r_i) of the desert sucker in the East and North Forks of the Virgin River in July, August and October of 1988. Electivity index values (in parentheses) are presented below volumes. Negative values indicate no preference for the item, positive values indicate a preferred item, and zero values indicate random feeding.

	East Fork						North Fork					
	July		August		October		July		August		October	
	p_i	r_i	p_i	r_i	p_i	r_i	p_i	r_i	p_i	r_i	p_i	r_i
Plecoptera												
Perlodidae							14.7	0	3.6	0	0.7	0
							(-1.00)		(-1.00)		(-1.00)	
Ephemeroptera												
Ephemerellidae							3.3	0			3.4	0
							(-1.00)				(-1.00)	
Baetidae	68.3	42.7	25.8	45.5	73	5.4	39.3	50	72.5	38.5	48.9	62.5
	(-0.78)		(-0.24)		(-0.92)		(-0.65)		(-0.64)		(-0.62)	
Leptophlebiidae							0.1	0				
							(-1.00)					
Heptageniidae							2	0	4.1	0	1.7	0
							(-1.00)		(-1.00)		(-1.00)	
Tricorythidae	1.8	0			1.9	0	0.6	0	4.9	0	2	0
	(-1.00)				(-1.00)		(-1.00)		(-1.00)		(-1.00)	
Trichoptera												
Hydropsychidae												
Hydropsyche sp.	3.3	0			3.4	0	28.8	0	4.9	0	23.6	0
	(-1.00)				(-1.00)		(-1.00)		(-1.00)		(-1.00)	
Hydroptilidae												
Mayatrichia							2.3	0	0.5	0		
							(-1.00)		(-1.00)			
Ochotrichia sp.					0.1	0	0.3	0			0.1	0
					(-1.00)		(-1.00)				(-1.00)	
Diptera												
Empididae			0	15.2	0.2	0						
			(+0.68)		(-1.00)							
Chironomidae	1.2	50	4.1	21.2	4.3	54	0.9	50	3.8	53.8	0.5	33.3
	(+0.79)		(+0.28)		(+0.75)		(+0.87)		(+0.71)		(+0.85)	
Simuliidae												
Simulium sp.	3.6	8.3			8.9	27			2.5	0	1.8	4.2
	(-0.36)				(+0.27)				(-1.00)		(-0.40)	
Athericidae												
Atherix sp.	4.8	0	22.1	18.2	1.5	0	0.5	0	2.3	0		
	(-1.00)		(-0.55)		(-1.00)		(-1.00)		(-1.00)			
Muscidae					4	13.5						
					(+0.32)							
Ceratopogonidae	0.2	0										
	(-1.00)											
Lepidoptera												
Pyralidae												
Petrophila sp.			19.3	0			0.5	0			0.4	0
			(-1.00)				(-1.00)				(-1.00)	
Coleoptera												
Elmidae							5	0			0.2	0
							(-1.00)				(-1.00)	
Hemiptera												
Naucoridae							0.1	0				
							(-1.00)					
Megaloptera												
Corydalidae	15.2	0	24.8	0	1.1	0					16.1	0
	(-1.00)		(-1.00)		(-1.00)						(-1.00)	
Arachnida												
Hydracarina	1.5	0	0.7	0	1.3	0	1.5	0	0.8	7.7	0.5	0
	(-1.00)		(-1.00)		(-1.00)		(-1.00)		(+0.60)		(-1.00)	

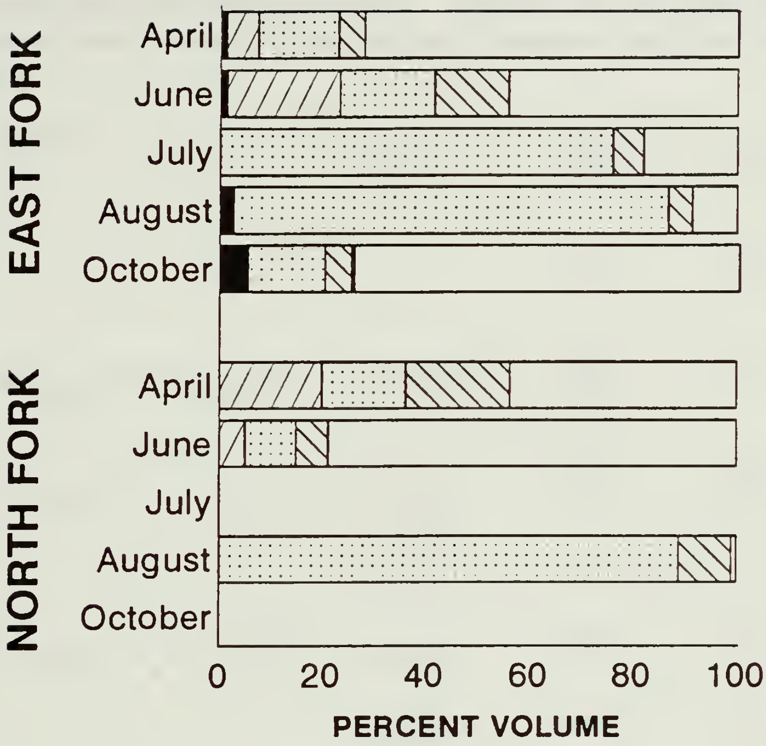

Figure 5. The composition of general food items (■ Algae; ▨ Plant material; ⚃ Organic material; ▧ Inorganic material; ⊠ Terrestrial Invertebrates; and □ Aquatic Invertebrates) found in the stomachs of the flannelmouth suckers collected from the East and North Forks of the Virgin River.

A variety of aquatic insects were consumed at the East Fork site (Table 5). A variety of ephemeropterans, dipterans, and trichopterans were consumed and at times comprised a large proportion of flannelmouth suckers diet at the East Fork site. Only chironomids were consumed at the North Fork site. Negative electivity values indicate that relative to the proportion of the invertebrates in the environment, invertebrates consumed by the flannelmouth sucker were not being actively selected. Taxa preferred by flannelmouth suckers appeared to vary randomly, suggesting that even though aquatic insects were present in relatively high proportions in the diet they were not being actively selected.

Table 5. Relative volumes of the various aquatic invertebrates found in the environment (p^i) and in the diet (p_i) of the flannelmouth sucker in the East Fork of the Virgin River in July, August, and October and in the North Fork of the River in August of 1988. No flannelmouth suckers were collected in July and October from the North Fork of the Virgin River. Electivity index values (in parentheses) are presented below. Volumes with negative values indicate no preference for the item, positive values indicate a preferred item, and zero values indicate random feeding.

	East Fork						North Fork					
	July		August		October		July		August		October	
	p_i	r_i	p_i	r_i	p_i	r_i	p_i	r_i	p_i	r_i	p_i	r_i
optera												
erlodidae							14.7		3.6		0.7	
emeroptera												
phemerellidae							3.3				3.4	
aetidae	68.3	28.7	25.8	18.8	73	18.3	39.3		72.5		48.9	
		(-0.95)		(-0.83)		(-0.71)						
eptophlebiidae							0.1					
eptageniidae							2		4.1		1.7	
icorythidae	1.8	11.5	4.1	0	1.9	0	0.6		4.9		2	
		(-0.48)		(-1.00)		(-1.00)						
mergents					0	0.7						
						(+0.27)						
optera												
ydropsychidae												
Hydropsyche sp.	3.3	0	0	47.2	3.4	3.4	28.8		4.9		23.6	
		(-1.00)		(+0.83)		(-0.20)						
ydroptilidae												
Mayatrichia					0	0.1	2.3		0.5			
						(-0.87)						
Ochotrichia sp.					0.1	0	0.3				0.1	
						(-1.00)						
era												
npididae					0.2	0						
						(-1.00)						
ironomidae	1.2	11.5	4.1	22.7	4.3	65.8	0.9		3.8	100	0.5	
		(-0.31)		(-0.15)		(+0.82)						
muliidae												
Simulium sp.	3.6	18.4			8.9	8			2.5		1.8	
		(-0.56)				(-0.25)						
hericidae												
Atherix sp.	4.8	0	22.1	0	1.5	0	0.5		2.3			
		(-1.00)		(-1.00)		(-1.00)						
uscidae					4	0						
						(-1.00)						
eratopogonidae	0.2	28.7	0	1.8	0	3	0					
		(+0.77)		(-0.61)		(-0.76)						
ratiomyidae							0					
doptera												
ralidae												
Petrophila sp.			19.3	0			0.5				0.4	
				(-1.00)								
optera												
midae							5				0.2	
ptera												
ucoridae							0.1					
aloptera												
rydalidae	15.2	0	24.8	0	1.1	0					16.1	
		(-1.00)		(-1.00)		(-1.00)						
nnida												
racarina	1.5	1.1	0.7	9.4	1.3	0.7	1.5		0.8		0.5	
		(-0.92)		(+0.43)		(-0.47)						

The flannelmouth is reported to be more generalized in its food habits than the desert sucker, feeding on a wide variety of materials (Cross 1975). Cross (1975) observed a predilection in the desert sucker for rocky substrates, while flannelmouth suckers appeared more general in their habitat selection and were found predominantly over sand substrates. At the time fish communities were collected in July, the substrate at the North Fork site was predominantly large cobble and small boulders with a heavy growth of filamentous algae and diatoms. The East Fork substrate was more diverse, with large areas of sand that is generally less stable and as a result less biologically productive.

CONCLUSION

The fish communities of the East and North Forks of the Virgin River within Zion National Park were comprised primarily of native species (Virgin spinedace, speckled dace, flannelmouth sucker, and desert sucker). Examination of food resource availability and use by this native fish assemblage indicated that partitioning of habitat and food resources appeared to limit direct biotic interactions. When aquatic invertebrates densities were relatively high, a partitioning food and space between the Virgin spinedace and speckled dace was apparent. The high proportion of terrestrial and emergent aquatic invertebrates in the diet of the Virgin spinedace indicated that they were feeding primarily in the water column or on surface drift. The diet of the speckled dace comprised primarily of benthic invertebrates and a substantial amount of organic material indicated this species was primarily a benthic feeder. Overlap of diets of these two species were apparent, however, when aquatic invertebrate densities were low after substrates were disturbed by high flows. The diet of the desert sucker was consistently comprised of high proportions of organic material (detritus, diatoms, and other unidentifiable debris). The flannelmouth sucker exhibited the most generalized food habits of the species examined. The flannelmouth suckers were omnivorous, consuming a wide range of foods items including aquatic insects, algae, plant material, organic material, and inorganic debris. Some dietary overlap was also observed between the desert suckers and flannelmouth suckers when aquatic insect densities were low.

Fluctuations in food availability associated with high flows were reflected by short term dietary shifts. Virgin spinedace appear to rely more heavily on sight feeding than the other native species. They have a larger eye and feed heavily on drift organisms. Increased flows, accompanied by increased turbidity and substrate disturbance causes a shift in dietary habits. However, these shifts do not apparently have a long term effect on the Virgin spinedace population. Nevertheless this species could be adversely affected by conditions leading to an

increase in frequency and/or duration of turbid conditions. Speckled dace also rely on sight for feeding, but are less selective as indicated by the diversity of food items consumed, including organic material. As a result their feeding habits probably will be less affected by an increase in frequency and/or duration of turbidity than the Virgin spinedace.

The flannelmouth sucker exhibited the most generalized food habits of the species examined. Therefore, they should be least likely to be food-limited. However, their absence from some and scarcity in other North Fork River collections implies that at times they are the rarest native fish species in Zion National Park. Dietary overlap between flannelmouth and desert suckers was apparent when food availability was relatively low. When invertebrate densities in the environment decreased and the proportion of invertebrates consumed by the flannelmouth suckers examined decreased while the proportion of inorganic material increased. At the same time the dietary habits of the desert suckers, adapted to feed primarily on organic material, remained relatively consistent. Desert suckers have short gill rakers and a long intestinal track that aid its ability to feed on and readily digest plant material. The effect of competition between desert suckers and flannelmouth sucker populations is not directly apparent. It is probable that the river below the Park boundary plays an important role in maintenance of flannelmouth populations within the Park, possibly limiting access to available habitat and/or constricting migration patterns. Future studies are needed to assess what abiotic and/or biotic factors are controlling flannelmouth populations.

Vulnerability of Virgin spinedace to habitat alteration is well demonstrated by Valdez *et al.* (1991) who noted that the best extant populations occur within Zion National Park. Elsewhere throughout its range populations have been decimated. Native fish populations throughout the west have been affected by alterations in natural flows, reservoir construction, sport fish management, and increased recreational use of water (Deacon 1979, Minckley and Deacon

1968). Ross (1986) showed that abiotic factors may not be important in structuring fish communities in fluctuating environments. That generalization may be true for natural systems over evolutionary time, but does not, however, preclude catastrophic restructuring of the fish community by introduction and establishment of a species capable of succeeding in a fluctuating environment (Minckley and Deacon 1968). Such a scenario is presently occurring in the lower Virgin River where the red shiner *Notropis lutensis* is restructuring the native fish community (Deacon 1988). Flow variability may also be important in preventing establishment of some exotic species. It is likely that the mosquitofish *Gambusia affinis* and some centrarchids could become established in the East and North Forks of the Virgin River within the boundaries of the Park under conditions of reduced frequency and intensity of floods. Highly variable flows and low habitat heterogeneity, which the native fishes of the Virgin River appear to be uniquely adapted to, however, appears to reduce the invasion and establishment of non-native species in southwestern streams (Deacon 1979, Cross 1985, Valdez *et al.* 1991).

Deacon *et al.* (1991) demonstrated that the four native species partition space rather well. In this study we found that food, in general, was similarly well partitioned. It appears that resource partitioning limits direct biotic interactions among this fish assemblage. While analyses of persistence and stability have not been attempted, information and data provided by Cross (1975, 1985), and data from Deacon *et al.* (1991) and this study suggest that both persistence and stability of these fish populations are high. Collectively these studies indicate a stable, predictable native fish community in which resource partitioning is well-defined.

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Appendix A

Invertebrate taxa and abundances collected in 1987 in conjunction with aquatic inventory of Zion National Park and in 1988 in conjunction with collection of fish for stomach analysis.

Invertebrate taxa and relative abundances collected in 1987 and in 1988 in conjunction with collection of fish for stomach analysis.

	East Fork						North Fork					
	July		August		October		July		August		October	
	1988	1987	1988	1987	1988	1987	1988	1987	1988	1987	1988	1987
Arthropoda												
Insecta												
Plecoptera												
Perlodidae												
Isogenoides sp.	0	0	0	0	0	0	17	0	1	0	1	0
Isoperla sp.	0	0	0	0	0	0	1	0	0	0	0	0
Ephemeroptera												
Ephemerellidae												
Ephemerellla inermis	0	0	0	0	0	0	10	0	0	0	12	9
Baetidae												
Baetis insignificans	48	29	0	0	34	34	16	0	4	0	29	0
Baetis tricaudatus	105	48	12	8	313	72	177	53	83	9	253	54
Baetis sp.	35	0	0	0	37	0	4	0	1	0	10	0
Leptophlebiidae												
Paraleptophlebia sp.	0	0	0	0	0	0	1	0	0	0	0	0
Heptageniidae												
Heptagenia sp.	0	0	0	0	0	0	6	4	3	0	6	6
Tricorythidae												
Tricorythodes sp.	5	10	2	3	10	5	3	217	6	7	12	6
Trichoptera												
Hydropsychidae												
Hydropsyche sp.	3	1	0	3	6	5	48	45	2	1	47	52
Hydroptilidae												
Mayatrichia	0	1	0	0	0	0	17	24	1	0	0	0
Ochotrichia sp.	0	2	0	1	1	3	2	0	0	1	1	1
Polycentropidae												
Polycentropus sp.	0	0	0	0	0	0	0	0	0	0	0	1
Diptera												
Empididae												
Clinocera sp.	0	0	0	0	2	0	0	0	0	0	0	0
Chelifera sp.	0	0	0	0	0	1	0	0	0	0	0	0
Chironomidae	10	4	6	0	68	131	13	5	14	3	9	62
Simuliidae												
Simulium sp.	10	19	0	0	47	36	0	0	3	2	11	0
Athericidae												
Atherix sp.	5	1	4	1	3	1	1	0	1	0	0	0
Muscidae												
Limnophora sp.	0	0	0	0	7	0	0	0	0	0	0	0
Ceratopogonidae	2	0	0	0	0	0	0	0	0	0	0	0
Lepidoptera												
Pyralidae												
Petrophila sp.	0	0	4	2	0	0	1	0	0	0	1	0
Coleoptera												
Elmidae												
Microcylloepus sp.	0	1	0	0	0	1	19	3	0	0	1	0
Hemiptera												
Naucoridae												
Ambrysus sp.	0	0	0	0	0	0	1	0	0	0	0	0
Megaloptera												
Corydalidae												
Corydalus sp.	7	7	2	0	1	0	0	0	0	0	4	0
Arachnida												
Hydracarina	12	26	1	1	21	16	23	13	3	1	9	27

Appendix B

Fish stomach data from 1988 and 1989 from the North and East Forks of the Virgin River.

Fish stomach analysis from 1988 and 1989 from the North and East Forks of the Virgin River.

EAST FORK
1988

	% FULL	FOOD ITEMS * 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
JUNE15																																		
FLANNELMOUTH	95	0	0	0	0	0	0	10	5	0	0	0	0	0	0	0	5	5	0	5	0	0	0	0	0	0	0	1	0	0	0	0	50	5
FLANNELMOUTH	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	5
FLANNELMOUTH	90	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	5	5	0	5	0	0	0	0	0	0	0	1	0	0	0	0	70	5
FLANNELMOUTH	70	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	80	5
FLANNELMOUTH	95	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	0	0	1	0	1	0	0	0	0	85	5
SPECKLED DACE	80	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	5	5	0	20	0	0	0	0	0	0	20	0	0	0	0	5	30	5
SPECKLED DACE	30	0	20	0	0	0	0	10	0	0	0	0	0	0	0	0	5	5	40	0	0	0	0	0	0	0	10	0	0	0	0	0	10	1
SPECKLED DACE	20	20	40	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
SPECKLED DACE	20	40	0	0	0	0	0	15	0	0	0	0	0	0	0	0	5	5	0	5	0	0	0	0	0	0	10	0	0	0	0	5	10	5
SPECKLED DACE	75	15	0	0	0	0	0	10	0	0	0	0	30	0	0	0	5	0	0	5	0	0	0	0	0	0	5	0	0	0	0	1	30	0
VIRGIN SPINEDACE	30	60	0	0	0	0	0	5	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0
VIRGIN SPINEDACE	60	10	0	0	0	0	0	5	0	0	10	0	30	0	0	0	0	0	0	5	0	0	0	0	0	0	10	0	0	0	0	0	30	0
VIRGIN SPINEDACE	70	50	0	0	0	0	0	1	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	10	0
VIRGIN SPINEDACE	75	35	10	5	0	0	0	5	5	0	10	0	20	0	0	0	1	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	1
VIRGIN SPINEDACE	50	10	40	0	0	0	0	5	0	0	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	15	0	0	0	0	0	20	1
DESERT SUCKER	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	90	5
DESERT SUCKER	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	95	5
DESERT SUCKER	85	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5	0	0	1	0	0	0	0	0	0	0	5	0	0	0	0	80	5
DESERT SUCKER	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	95	5
DESERT SUCKER	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	95	1
AUG13																																		
FLANNELMOUTH	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	5
FLANNELMOUTH	80	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	90	5
FLANNELMOUTH	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	90	5
FLANNELMOUTH	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5	90	5
FLANNELMOUTH	80	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	80	5
SPECKLED DACE	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	80	5
SPECKLED DACE	20	20	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	40	1
SPECKLED DACE	10	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	20	0
SPECKLED DACE	30	40	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	30	5
SPECKLED DACE	20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	60	10
VIRGIN SPINEDACE	60	10	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	60	1
VIRGIN SPINEDACE	30	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	70	1
VIRGIN SPINEDACE	20	30	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	1	40	0
VIRGIN SPINEDACE	20	10	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	60	1
VIRGIN SPINEDACE	20	20	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	1
DESERT SUCKER	80	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	80	5
DESERT SUCKER	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	95	5
DESERT SUCKER	75	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0	1	5	80	5
DESERT SUCKER	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	5
DESERT SUCKER	80	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5	75	5
AUG14																																		
FLANNELMOUTH	50	0	0	0	0	0	0	0	0	0	0	0	25	0	0	0	5	1	0	0	0	0	0	0	0	5	0	0	0	0	0	0	60	5
SPECKLED DACE	50	0	0	0	0	0	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	5
SPECKLED DACE	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	80	5
SPECKLED DACE	10	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	10
SPECKLED DACE	5	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	5	0	0	0	0	0	60	15
SPECKLED DACE	25	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	30	20
VIRGIN SPINEDACE	40	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0
VIRGIN SPINEDACE	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	70	20
VIRGIN SPINEDACE	20	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	50	0
VIRGIN SPINEDACE	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	20	5
VIRGIN SPINEDACE	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0	0	0	10	0	0	0	0	0	10	0

DESERT SUCKER	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	60	40
DESERT SUCKER	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	50	45
DESERT SUCKER	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	40	60
DESERT SUCKER	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	70	25
DESERT SUCKER	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	45	50
OCT22																																		
FLANNELMOUTH	95	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	55	1	0	5	1	0	0	0	0	0	0	0	0	0	0	5	10	5
FLANNELMOUTH	95	0	0	0	0	0	0	10	0	0	5	0	0	0	0	0	45	0	0	5	0	0	0	0	0	0	5	0	0	0	0	0	20	10
FLANNELMOUTH	90	0	0	0	0	0	0	30	0	0	0	0	5	0	0	0	40	1	0	10	5	0	0	0	0	0	0	0	0	0	0	0	10	1
FLANNELMOUTH	80	1	0	0	0	0	0	25	0	0	0	0	0	0	0	0	35	5	0	10	5	0	0	0	0	0	0	0	0	0	0	5	10	5
FLANNELMOUTH	90	0	0	0	0	0	0	20	0	0	0	0	5	0	0	0	40	0	0	5	5	0	0	0	0	0	0	0	0	0	0	10	10	5
SPECKLED DACE	50	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	10	5
SPECKLED DACE	75	0	0	0	0	0	0	70	0	5	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	5
SPECKLED DACE	40	1	0	0	0	0	0	20	0	0	0	0	0	0	0	0	35	1	0	10	0	0	0	0	0	0	5	0	0	0	0	0	20	5
SPECKLED DACE	40	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	20	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	30	10
SPECKLED DACE	5	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	10	1
VIRGIN SPINEDACE	70	0	0	0	0	40	0	10	0	0	0	0	10	0	0	0	5	0	0	0	0	5	0	0	0	0	5	0	0	0	0	20	5	0
VIRGIN SPINEDACE	80	10	0	0	0	20	0	10	0	0	0	0	5	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	30	10	5
VIRGIN SPINEDACE	80	0	0	0	0	25	0	15	0	0	0	0	0	0	5	0	5	1	0	10	0	5	0	0	0	0	0	0	0	0	0	30	5	0
VIRGIN SPINEDACE	90	50	0	0	0	0	0	20	0	0	10	0	0	0	0	0	5	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	5	0
VIRGIN SPINEDACE	80	20	10	0	0	0	0	20	0	0	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	0	1	0	0	0	0	20	5	5
DESERT SUCKER	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	5
DESERT SUCKER	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	5
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	5
DESERT SUCKER	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	85	5
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	5	0	0	0	0	1	90	5
OCT23																																		
FLANNELMOUTH	95	5	0	0	0	0	0	5	0	0	0	0	5	1	0	0	55	0	0	0	0	0	0	0	0	5	5	0	0	0	0	1	15	5
FLANNELMOUTH	80	0	0	0	0	0	0	5	0	0	0	0	5	0	0	0	40	5	0	1	0	0	0	0	0	0	0	0	0	0	0	20	20	5
FLANNELMOUTH	90	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	65	5	0	1	0	0	0	0	0	0	0	0	0	0	0	5	15	5
FLANNELMOUTH	90	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	60	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	5
FLANNELMOUTH	90	0	0	0	0	0	0	5	0	0	0	0	5	0	0	0	50	0	0	1	5	0	0	0	0	0	0	0	0	0	0	10	20	5
SPECKLED DACE	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	5	5
SPECKLED DACE	10	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	10	5
SPECKLED DACE	20	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	40	0	0	10	0	0	0	0	0	0	5	0	0	0	0	20	10	5
SPECKLED DACE	50	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	50	0	0	5	0	0	0	0	0	0	5	0	0	0	0	0	30	5
SPECKLED DACE	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	10	0	0	0	0	0	0	5	0	0	0	0	0	40	5
VIRGIN SPINEDACE	20	0	0	0	0	0	0	1	0	0	0	0	0	0	20	0	10	0	0	0	0	0	0	0	0	0	5	0	0	0	0	20	10	5
VIRGIN SPINEDACE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGIN SPINEDACE	40	0	0	0	0	60	0	5	0	0	10	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	5
VIRGIN SPINEDACE	30	25	0	0	0	0	0	15	0	0	10	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	10	5
VIRGIN SPINEDACE	50	10	20	0	0	50	0	20	0	0	0	0	0	0	0	0	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10	5	1
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	1	80	10
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	90	5
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	85	5
DESERT SUCKER	95	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	5
DESERT SUCKER	95	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	5
1989																																		
APR15																																		
FLANNELMOUTH	90	0	0	0	0	0	0	30	0	0	0	0	5	0	0	0	5	0	0	20	20	0	0	0	0	0	0	0	0	0	0	0	15	5
FLANNELMOUTH	80	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	30	20	0	10	0	10	0	0	0	0	0	0	0	0	0	0	15	5
FLANNELMOUTH	60	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	40	10	0	0	15	15	0	0	0	0	0	0	0	0	0	5	10	0
SPECKLED DACE	40	30	0	0	0	0	0	55	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	10	0
SPECKLED DACE	20	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	5	10	0	0	0	0	0	10	5
SPECKLED DACE	50	0	0	0	0	0	0	30	0	10	0	0	0	0	0	0	0	0	0	10	20	0	0	0	0	0	15	0	0	0	10	0	0	5
SPECKLED DACE	65	0	0	0	0	0	30	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPECKLED DACE	20	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGIN SPINEDACE	50	0	0	0	0	95	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
VIRGIN SPINEDACE	65	0	0	0	0	40	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	20	0	5	5
VIRGIN SPINEDACE	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0

VIRGIN SPINEDACE	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	70	0
VIRGIN SPINEDACE	30	0	0	0	0	30	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	20	0	0	0
DESERT SUCKER	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	5	0	0	0	0	75	10
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	20	69	10
DESERT SUCKER	100	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	15	63	10
DESERT SUCKER	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	1	0	0	5	20	60	10
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	3	5	70	20
APR16																																		
FLANNELMOUTH	95	0	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	0	5	15	0	0	0	0	0	0	0	0	5	30	5	15	5
FLANNELMOUTH	75	0	0	0	0	0	0	1	0	0	0	5	5	0	0	0	30	0	0	5	5	15	5	0	0	0	0	0	0	4	0	0	20	5
FLANNELMOUTH	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	5	0	5	0	20	0	0	0	0	0	0	0	0	5	0	15	10
FLANNELMOUTH	80	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	35	5	0	5	1	25	0	0	0	0	4	0	0	0	0	0	15	5
FLANNELMOUTH	85	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	25	5	0	10	0	25	0	0	0	0	0	0	0	5	0	0	20	5
SPECKLED DACE	70	0	0	0	0	0	0	5	0	0	0	5	40	0	0	0	0	0	0	0	20	0	0	0	0	1	4	20	0	0	0	0	5	0
SPECKLED DACE	70	0	0	0	0	0	0	10	0	5	0	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0
SPECKLED DACE	60	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0
SPECKLED DACE	40	0	0	0	0	0	0	0	0	0	0	5	65	0	0	0	0	0	0	0	15	0	0	0	0	0	10	0	0	5	0	0	0	0
SPECKLED DACE	30	0	10	0	0	0	0	0	0	0	0	40	0	0	0	0	15	0	0	25	0	0	0	0	0	0	10	0	0	0	0	0	0	0
VIRGIN SPINEDACE	60	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	10	10	30	0	0	0	0	0	0	0	0	40	0	0	0
VIRGIN SPINEDACE	70	0	0	0	0	0	0	0	0	0	0	20	34	0	0	0	0	15	0	0	10	0	0	0	0	0	0	1	0	0	20	0	0	0
VIRGIN SPINEDACE	70	0	0	0	0	0	0	10	0	0	0	10	20	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	50	0	0	0
VIRGIN SPINEDACE	65	0	0	0	0	0	0	10	0	0	0	15	45	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	15	0	0	0
VIRGIN SPINEDACE	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGIN SPINEDACE	60	0	0	0	0	0	0	10	0	0	0	0	0	0	0	15	0	0	0	0	15	0	0	44	0	0	0	0	0	0	15	0	0	1
DESERT SUCKER	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	5	5	3	50	35
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	1	0	0	0	0	0	1	0	0	0	2	0	5	55	30
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	75	20
DESERT SUCKER	100	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	5	0	0	0	0	0	0	0	0	0	1	5	0	10	3	10	55	10
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1	1	0	10	5	5	70	5
JUN11																																		
FLANNELMOUTH	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	10	10
FLANNELMOUTH	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	10	10	0	0	0	0	5	0	0	0	20	0	10	5
FLANNELMOUTH	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	0	0	5	0	0	0	0	0	5	0	0	5	0	0	10	5
FLANNELMOUTH	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0	0	0	0	0	0	0	5	10	0	10	10
FLANNELMOUTH	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	5	0	0	15	20	0	40	5
FLANNELMOUTH	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	20	10	5	30	30
FLANNELMOUTH	80	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	1	0	0	5	4	20	60
FLANNELMOUTH	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	3	2
FLANNELMOUTH	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	5	0	0	0	0	0	0	0	0	0	30	15	5	30	5
FLANNELMOUTH	70	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	5	0	0	50	0	20	10
SPECKLED DACE	85	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	60
SPECKLED DACE	40	0	0	0	0	0	0	0	0	0	0	20	10	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	10	10
SPECKLED DACE	80	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	5	0	0	10	0	0	0	0	0	0	5	0	0	0	0	0	5	60
SPECKLED DACE	70	5	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10	0	0	5	0	0	0	0	0	0	10	0	0	10	0	15	20	15
SPECKLED DACE	30	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	0	50	0	0	0	0
SPECKLED DACE	70	0	0	0	0	0	0	25	0	5	0	25	0	0	0	5	15	0	0	0	0	0	0	0	0	0	0	5	0	5	0	0	5	10
SPECKLED DACE	60	0	0	0	0	0	0	20	0	1	0	50	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	0	0
SPECKLED DACE	40	0	0	0	0	0	0	10	0	0	0	20	0	0	0	10	0	0	0	20	0	0	0	0	0	0	0	5	0	0	0	0	5	30
SPECKLED DACE	90	0	0	0	0	0	0	5	0	0	0	5	50	0	0	10	0	0	0	10	0	0	0	0	0	0	0	5	0	0	0	5	5	5
SPECKLED DACE	60	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	30	0	0	25	5	0	0	0	0	1	0	5	0	4	0	0	5	5
VIRGIN SPINEDACE	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0	0	0	0	10	0	0	20	0	0	5	0
VIRGIN SPINEDACE	75	50	15	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	5	0	0	0	0	0	10	0	0	0	0	0	0	0
VIRGIN SPINEDACE	30	0	65	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0
VIRGIN SPINEDACE	65	0	20	0	0	0	0	15	0	0	0	15	30	0	0	0	0	0	0	0	5	0	0	0	0	0	5	0	0	0	0	0	5	5
VIRGIN SPINEDACE	65	10	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	30	10	0	20	5
VIRGIN SPINEDACE	80	90	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGIN SPINEDACE	80	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	5	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	30	50
VIRGIN SPINEDACE	70	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	20	20
VIRGIN SPINEDACE	75	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	20	0	0	20	20
VIRGIN SPINEDACE	50	10	5	0	0	0	0	0	0	0	0	5	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	30

DESERT SUCKER	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	10	0	30	40	10
DESERT SUCKER	80	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	30	50	10
DESERT SUCKER	80	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	20	0	40	30	0
DESERT SUCKER	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	1	5	10	0	0	4	10	50	10
DESERT SUCKER	70	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5	0	0	0	0	0	0	0	0	0	2	3	0	10	0	30	40	5
DESERT SUCKER	75	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2	15	50	30
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	10	10	2	70	5
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	1	0	10	10	10	60	5
DESERT SUCKER	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	70	10
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	10	0	3	80	5
NORTH FORK																																		
1988																																		
JUL14																																		
SPECKLED DACE	60	20	0	0	0	0	0	10	10	0	5	0	20	5	5	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	5
SPECKLED DACE	80	0	0	0	0	0	0	50	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	20	5
SPECKLED DACE	30	0	0	0	0	0	0	60	0	0	0	0	0	0	5	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	5
SPECKLED DACE	80	0	0	0	0	0	0	70	5	0	5	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	5
SPECKLED DACE	50	25	0	0	0	0	0	10	5	0	5	0	30	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	5
VIRGIN SPINEDACE	90	30	30	0	0	0	0	15	5	0	0	0	5	0	0	0	5	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	10	10
VIRGIN SPINEDACE	80	20	30	10	0	0	0	10	0	0	0	0	5	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	5
VIRGIN SPINEDACE	90	70	0	0	0	0	0	15	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	5
DESERT SUCKER	95	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	5
DESERT SUCKER	95	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	90	5
JUL15																																		
SPECKLED DACE	20	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5	60	5
SPECKLED DACE	40	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	75	5
AUG13																																		
FLANNELMOUTH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	10
SPECKLED DACE	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	5
SPECKLED DACE	20	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	40	0
SPECKLED DACE	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1
SPECKLED DACE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPECKLED DACE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGIN SPINEDACE	90	0	80	0	0	0	0	10	0	0	5	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1
VIRGIN SPINEDACE	95	0	90	0	0	0	0	5	0	0	5	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGIN SPINEDACE	75	10	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	0
VIRGIN SPINEDACE	90	0	80	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0
VIRGIN SPINEDACE	60	0	80	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	5
DESERT SUCKER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	20
DESERT SUCKER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	90	10
DESERT SUCKER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	5
DESERT SUCKER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	15
DESERT SUCKER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	10
AUG14																																		
SPECKLED DACE	20	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	10	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	30	5
SPECKLED DACE	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	80	0
SPECKLED DACE	10	0	0	0	0	0	0	80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	1
SPECKLED DACE	70	0	0	0	0	0	0	50	0	10	0	0	5	0	0	0	10	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	10	5
VIRGIN SPINEDACE	80	10	60	0	0	0	0	15	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	1
VIRGIN SPINEDACE	90	60	0	0	0	0	0	10	0	0	5	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	10	0	0	0	0	1	10	0
VIRGIN SPINEDACE	40	20	30	0	0	0	0	15	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	10	5
VIRGIN SPINEDACE	50	60	20	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	1
VIRGIN SPINEDACE	30	30	20	0	0	0	0	20	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5	10	0
DESERT SUCKER	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	80	20
DESERT SUCKER	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	25
DESERT SUCKER	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	15
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	10
DESERT SUCKER	95	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	10
OCT22																																		

SPECKLED DACE	80	0	0	0	0	0	0	40	0	0	0	0	20	0	0	0	5	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	20	5
SPECKLED DACE	20	0	0	0	0	0	0	75	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	5
SPECKLED DACE	40	0	0	0	0	0	0	90	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
SPECKLED DACE	20	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	5
VIRGIN SPINEDACE	50	20	0	0	0	0	0	45	0	0	5	0	15	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5	1
VIRGIN SPINEDACE	20	10	0	0	0	0	0	80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1
VIRGIN SPINEDACE	60	25	0	0	0	0	0	50	0	0	5	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5	0
VIRGIN SPINEDACE	50	30	0	0	0	0	0	30	0	0	5	0	5	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	15	5
VIRGIN SPINEDACE	30	20	0	0	0	0	0	40	0	0	10	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	5	0	0	0	0	0	10	5
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	95	5
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	10
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	90	10
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	95	5
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	95	5
OCT23																																		
VIRGIN SPINEDACE	20	1	0	0	0	0	0	15	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	10	5
VIRGIN SPINEDACE	40	10	0	0	0	0	0	10	0	0	0	0	5	0	0	0	5	0	0	1	0	0	0	0	0	0	10	0	0	0	0	50	10	1
VIRGIN SPINEDACE	40	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	10	0	0	0	0	40	20	5
VIRGIN SPINEDACE	20	40	0	0	0	0	0	10	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	10	5
VIRGIN SPINEDACE	30	40	0	0	0	0	0	5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	5	0	0	0	0	20	25	5
DESERT SUCKER	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	5
DESERT SUCKER	90	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	70	10
DESERT SUCKER	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	5
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	95	5
DESERT SUCKER	90	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	5
1989																																		
APR15																																		
FLANNELMOUTH	80	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5	1	0	0	13	0	0	0	0	0	0	70	0	0	5
FLANNELMOUTH	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	10	20
FLANNELMOUTH	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	40	40
FLANNELMOUTH	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15
SPECKLED DACE	10	0	0	0	0	0	0	85	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
SPECKLED DACE	15	0	0	0	0	0	0	75	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0
SPECKLED DACE	20	0	0	0	0	0	0	80	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0
SPECKLED DACE	40	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0
SPECKLED DACE	20	0	0	0	0	0	0	75	0	0	0	0	0	0	0	0	15	0	0	5	0	0	0	0	0	0	0	5	0	0	0	0	0	0
VIRGIN SPINEDACE	75	0	0	0	0	0	0	15	0	0	0	80	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0
VIRGIN SPINEDACE	85	10	10	0	0	0	0	20	0	5	0	20	10	0	0	0	0	0	0	5	0	0	0	0	15	0	0	0	0	0	0	0	2	3
VIRGIN SPINEDACE	85	0	0	0	0	0	0	45	0	0	0	30	0	0	0	0	0	0	0	3	0	0	0	20	0	0	0	0	0	0	0	0	2	0
VIRGIN SPINEDACE	70	0	0	0	0	0	0	50	0	0	0	30	0	0	0	0	5	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	5	0
VIRGIN SPINEDACE	70	0	0	0	0	0	0	22	0	0	0	75	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	75	15
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	75	20
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	3	2	70	20
DESERT SUCKER	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5	4	5	65	20
DESERT SUCKER	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	15	3	5	60	15
APR16																																		
SPECKLED DACE	25	0	0	0	0	0	0	70	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	0
SPECKLED DACE	10	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	20	0
SPECKLED DACE	20	0	0	0	0	0	0	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	5
SPECKLED DACE	70	0	0	0	0	0	0	75	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5
VIRGIN SPINEDACE	50	5	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	5	0	0	25	0	0	0	20	0	0	0	20	0	10	0
VIRGIN SPINEDACE	20	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0
VIRGIN SPINEDACE	30	0	0	0	0	0	0	20	0	40	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	5	0	0	0	0	0	0	5
VIRGIN SPINEDACE	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0	20	0
VIRGIN SPINEDACE	20	0	0	0	0	0	0	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	5
DESERT SUCKER	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	10	70	15
DESERT SUCKER	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	15	74	10
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	20	70	8
DESERT SUCKER	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	10	80	7

DESERT SUCKER	90	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	12	80	5
JUN11																																		
FLANNELMOUTH	40	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	80	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	5
FLANNELMOUTH	80	0	0	5	0	0	5	5	0	0	0	5	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	10	5
FLANNELMOUTH	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	5	0	0	0	0	0	0	0	0	0	10	0	0	15	10
FLANNELMOUTH	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	10	5
SPECKLED DACE	60	0	0	0	0	0	20	10	0	0	0	30	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0
SPECKLED DACE	50	0	0	0	0	0	0	40	0	0	0	10	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	10	0
SPECKLED DACE	60	0	0	0	0	0	0	0	0	0	0	15	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0
SPECKLED DACE	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	30	0	0	0	0	10	0
SPECKLED DACE	15	0	0	0	10	0	0	30	0	0	0	30	0	0	0	0	10	0	0	5	0	0	0	0	0	0	0	5	0	0	0	0	5	5
SPECKLED DACE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0
SPECKLED DACE	10	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPECKLED DACE	10	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPECKLED DACE	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0	0	0	0	0	5	0	0	10	5
SPECKLED DACE	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	0	10	0	0	0	0	0	0	0
VIRGIN SPINEDACE	30	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGIN SPINEDACE	15	0	0	0	0	0	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0
VIRGIN SPINEDACE	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	10	0
VIRGIN SPINEDACE	40	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	10	0
VIRGIN SPINEDACE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGIN SPINEDACE	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0	20	0
VIRGIN SPINEDACE	20	0	0	0	0	0	50	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0
VIRGIN SPINEDACE	15	0	0	0	0	0	0	40	0	0	0	20	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0
VIRGIN SPINEDACE	5	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGIN SPINEDACE	5	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	5	4	15	70	4
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	10	1	10	70	5
DESERT SUCKER	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	80	0
DESERT SUCKER	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	2	0	5	5	30	50	5
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	3	0	0	10	2	10	45	0
DESERT SUCKER	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1	1	3	0	15	7	10	60	0
DESERT SUCKER	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	70	15
DESERT SUCKER	80	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5	0	0	15	0	5	60	5
DESERT SUCKER	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	20	4	5	40	25
DESERT SUCKER	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3	0	0	5	0	5	80	5

FOOD ITEMS

1 Terrestrial Invertebrate
2 Formicidae
Aquatic Invertebrates
3 Coleoptera
4 Elmidae
5 Lepidoptera
6 Petrophila
Ephemeroptera
7 Baetis
8 Tricorythodes
9 Ephemerella
10 Adult Ephemeroptera
11 Unidentified Ephemeroptern Nymphs
Trichoptera
12 Hydropsyche
13 Mayatrichia
14 Ochrotrichia
15 Unidentified Trichoptera Larva

Diptera
16 Chironomidae
17 Ceratopogonidae
18 Atherix
19 Simulium
20 Simulium pupae
21 Limnophora
22 Stratiomyidae
23 Unidentified Diptera Larva
Odonate
24 Zygoptera
25 Hycracarina
26 Unidentified Invertebrates
Other
27 Nematoda
28 Larval Fish

29 Plant Material (Stems, Leaves, Etc.)
30 Seeds
31 Algae
32 Organic (Detritus, Muck, Etc.)
33 Inorganic (Sand, Etc.)